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Analysis date: 21 Jul 2014 22:01
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Workshop Reference #: A123-698

Customer Name	George Jones	**Vehicle Year**	2004
License Plate #	BGG2020	**Fuel Type**	Gasoline
Vehicle Make	Subaru	**Vehicle Mileage**	94000 miles
Vehicle Model	Legacy	**Exhaust Type**	Single Exhaust System

Test Results

HC	450	FAIL
CO	1.00	MARGINAL
O2	0.25	OK
CO2	10.60	FAIL
Lambda	0.970	OK

Exhaust Gas Diagnostics

Your vehicle emits multiple gases through the exhaust system. Evaluating the exhaust gases can help determine how your vehicle is performing and can identify small problems before they become major ones, often before your onboard diagnostics can trigger a Check Engine Light. Exhaust gas diagnostics is used along with other tests for a complete diagnostic evaluation on the health and performance of your vehicle, and can identify existing and potential problems.

Understanding the results of the test:

As a general rule for understanding the exhaust gas readings, if combustion were perfect, all of the fuel and oxygen from the air would be consumed, leaving only nitrogen, water and carbon dioxide (CO2) emitted from the tailpipe. However, in the real world, an engine never achieves complete combustion, and an analysis of the exhaust gas readings can direct you to potential drivability and performance issues.

A general guide to the gases:

HC (Hydrocarbon) Best to be at 65ppm or less. High HC levels represent unburned fuel, and often related to engine misfire. Typical causes include misfiring spark plug(s), bad ignition wire or bad port injector spray pattern.

CO (Carbon Monoxide) A by-product of incomplete combustion, represents the level of burned fuel. A good reading is about 0.75% or less. A high reading can indicate a fuel mixture richer than ideal. Leaking fuel injectors, or aging Oxygen Sensors may cause this.

O2 (Oxygen) Another by-product of incomplete combustion, O2 levels should be approximately 0.1-1.0%. A higher level may indicate a fuel mixture leaner than ideal, or an exhaust leak. High O2 coupled with High HC is a strong indicator of a misfire.

CO2 (Carbon Dioxide) A good level here is 13.5+%, which represents an ideal air/fuel mixture and efficient combustion. If HC, CO and O2 are within specification, lower readings of CO2 can be caused by a worn engine (high mileage), bad fuel, or failing sensors in the intake or exhaust.

Lambda (calculated) A measure of the air to fuel ration present during combustion. [illegible] good range is about 0.970 to 1.015. Under the range indicates [illegible] (excess fuel present), and above it indicates a lean air/fuel mix